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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,899	04/15/2004	Peter J. Unsworth	99RE059A / ALBRP133USA	7582
7590 01/10/2005			EXAMINER	
Susan M. Donahue Rockwell Automation, 704-P, IP Department 1201 South 2nd Street Milwaukee, WI 53204			STARKS, WILBERT L	
			ART UNIT	PAPER NUMBER
			2121	

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Applicati n N .</b> 10/824,899	<b>Applicant(s)</b> UNSWORTH ET AL.	
	<b>Examiner</b> Wilbert L. Starks, Jr.	<b>Art Unit</b> 2121	

**-- The MAILING DATE of this communication appears on th cover sheet with th c rrespondenc address --**

**Peri d f r Reply**

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 April 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-25 and 32-41 is/are allowed.
- 6) ☒ Claim(s) 1-3,8-11,13,18,26 and 27 is/are rejected.
- 7) ☒ Claim(s) 4-7,12,14-17 and 28-31 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims 1-41 have been examined.

#### ***Claim Objections***

2. Claim 6 is objected to because it is a dependent claim that is drawn to be dependent upon itself. Appropriate correction is required.
3. Claims 7 and 15-17 are objected to because they recite the term "outlayers" without antecedent basis for a layer structure. Examiner believes the word to be a misspelling of the word "outliers", but since Applicant is free to be his own lexicographer, Examiner will give Applicant an opportunity to clarify the term. Appropriate correction is required.

#### ***Claim Rejections - 35 U.S.C. §102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. §102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2121

5. Claims 1-3, 8-11, 13, 18, 26, and 27 are rejected under 35 U.S.C. §102(b) as being anticipated by Ilott, P. W., et al.<sup>1</sup> Specifically:

### Claim 1

Claim 1's "a sensor operatively coupled to a power lead of the motor, the sensor adapted to obtain at least one **current signal** relating to the operation of the pump; and" is anticipated by Ilott, P. W., et al, p. 263, where it recites:

A feed forward ANN was trained using the back propagation learning algorithm to recognize pump operating condition from **motor current** and delivery pressure parameter levels.

Claim 1's "an artificial neural network operatively coupled to the sensor, the **artificial neural network** being adapted to detect at least one fault relating to the operation of the pump from the at least one current signal." is anticipated by Ilott, P. W., et al, p. 263, where it recites:

A feed forward **ANN** was trained using the back propagation learning algorithm to recognize pump operating condition from motor current and delivery pressure parameter levels.

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<sup>1</sup> Ilott, P. W., et al, Development of a Pumping System Decision Support Tool Based on Artificial Intelligence, Tools with Artificial Intelligence, 1996., Proceedings Eighth IEEE International Conference on, 16-19 Nov 1996, pp. 260-266.

### Claim 2

Claim 2's "The system of claim 1, wherein the sensor is a **current transformer**."

is anticipated by Ilott, P. W., et al, p. 263, where it recites:

A feed forward ANN was trained using the back propagation learning algorithm to recognize pump operating condition **from motor current** and delivery pressure parameter levels.

### Claim 3

Claim 3's "The system of claim 1, wherein the artificial neural network is an **unsupervised neural network**" is anticipated by Ilott, P. W., et al, p. 261, where it recites:

ANNs are normally classified by learning procedure, the most common being **unsupervised** and supervised learning.

### Claim 8

Claim 8's "The system of claim 1, wherein the artificial neural network is also adapted to detect at least one fault relating to the operation of the motor from the at least one **current signal**. " is anticipated by Ilott, P. W., et al, p. 263, where it recites:

A feed forward ANN was trained using the back propagation learning algorithm to recognize pump operating condition **from motor current** and delivery pressure parameter levels.

### Claim 9

Claim 9's "collecting a first sample of **current data signal** relating to the operation of the pump;" is anticipated by Ilott, P. W., et al, p. 263, where it recites:

A feed forward ANN was **trained** using the back propagation learning algorithm to recognize pump operating condition **from motor current** and delivery pressure parameter levels.

Claim 9's "inputting the first sample of current data signal to a neural network, collecting a second sample of current data signal relating to the operation of the pump; and" is anticipated by Ilott, P. W., et al, p. 263, where it recites:

A feed forward ANN was **trained** using the back propagation learning algorithm to recognize pump operating condition **from motor current** and delivery pressure parameter levels.

Claim 9's "inputting the second sample of current data signal to the neural network, wherein any differences between the first signal and the second signal will be generated as a change in condition signal by the neural network, any change of condition signal representing a pump fault condition." is anticipated by Ilott, P. W., et al, p. 263, where it recites:

A feed forward ANN was trained using the back propagation learning algorithm to **recognize** pump operating condition **from motor current** and delivery pressure parameter levels.

### Claim 10

Claim 10's "The method of claim 9, wherein the step of collecting at least one sample of current data signal relating to the operation of the machine is accomplished by employing a **current transformer**." is anticipated by Ilott, P. W., et al, p. 263, where it recites:

A feed forward ANN was trained using the back propagation learning algorithm to recognize pump operating condition **from motor current** and delivery pressure parameter levels.

### Claim 11

Claim 11's "The method of claim 9, wherein the artificial neural network is an **unsupervised neural network**." is anticipated by Ilott, P. W., et al, p. 261, where it recites:

ANNs are normally classified by learning procedure, the most common being **unsupervised** and supervised learning.

### Claim 13

Claim 13's "The method of claim 9, wherein the first sample of current data is a **training sample** for training the neural network." is anticipated by Ilott, P. W., et al" is anticipated by Ilott, P. W., et al, p. 263, where it recites:

A feed forward ANN was trained using the back propagation learning algorithm to recognize pump operating condition **from m tor current** and delivery pressure parameter levels.

### Claim 18

Claim 18's "The method of claim 1, wherein the artificial neural network is also adapted to detect at least one fault relating to the operation of the motor from the at least one current signal." is anticipated by Ilott, P. W., et al" is anticipated by Ilott, P. W., et al, p. 263, where it recites:

A feed forward ANN was trained using the back propagation learning algorithm to recognize pump operating condition from motor current and delivery pressure parameter levels.

### Claim 26

Claim 26's "a sensor operatively coupled to a power source of the motor, the sensor adapted to obtain at least one current signal relating to the operation of the pump and the operation of the motor; and" is anticipated by Ilott, P. W., et al" is anticipated by Ilott, P. W., et al, p. 263, where it recites:

A feed forward ANN was trained using the back propagation learning algorithm to recognize pump operating condition from motor current and delivery pressure parameter levels.

Claim 26's "an artificial neural network operatively coupled to the sensor, the artificial neural network being adapted to detect at least one fault relating to the operation of the pump and at least one fault relating to the operation of the motor from the at least one current signal." is anticipated by Ilott, P. W., et al" is anticipated by Ilott, P. W., et al, p. 263, where it recites:



Art Unit: 2121

A feed forward ANN was trained using the back propagation learning algorithm to recognize pump operating condition from motor current and delivery pressure parameter levels.

### **Claim 27**

Claim 27's "The system of claim 26, wherein the artificial neural network is an **unsupervised neural network**" is anticipated by Ilott, P. W., et al, p. 261, where it recites:

ANNs are normally classified by learning procedure, the most common being **unsupervised** and supervised learning.

### ***Allowable Subject Matter***

6. Claims 4, 5, 12, 14, and 28-31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 19-25 and 32-41 are allowable over the prior art of record.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A. Eryurek et al. (U.S. Patent Number 6,397,114 B1; dated 28 May 2002; class 700; subclass 051) discloses a device in a process system for detecting events.

Art Unit: 2121

- B. Discenzo (U.S. Patent Number 6,326,758 B1; dated 04 December 2001; class 318; subclass 609) discloses integrated diagnostics and control systems.
- C. Reifman (U.S. Patent Number 5,442,555 A; dated 15 August 1995; class 701; subclass 099) discloses a combined expert system/neural networks method for process fault diagnosis.

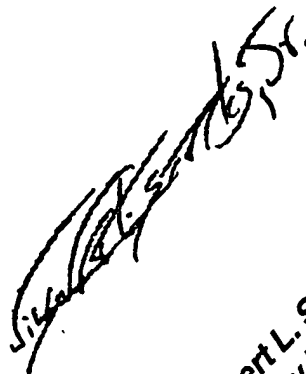
Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Wilbert L. Starks, Jr. whose telephone number is (571) 272-3691.

Alternatively, inquiries may be directed to the following:

<b>S. P. E. Anthony Knight</b>	<b>(571) 272-3687</b>
<b>After-final (FAX)</b>	<b>(703) 746-7238</b>
<b>Official (FAX)</b>	<b>(703) 746-7239</b>
<b>Non-Official/Draft (FAX)</b>	<b>(703) 746-7240</b>

WLS

04 January 2005



**Wilbert L. Starks, Jr.**  
**Primary Examiner**  
**Art Unit - 2121**